

A POD REPORT

COMPILED BY

ROSHNEE SUNDER

OUTCOMES FOR PODCASTING COURSE

2009/2010

FACILITATOR: MS GITA MISTRI

TEACHING AND LEARNING IN THE ERA OF YOUTUBE

Roshnee Sunder, Department of Radiography, Faculty of Health Sciences, DUT

INTRODUCTION

e-Learning, according to Brown (2005) emerged as an educational concept during the 1990s owing to the evolution in technology and the internet or world wide web. He adds that it has become a “necessary mode of delivery in most educational institutions.” The use of the Web, email in education, virtual learning environments (VLE) or learning management systems (LMS) like WebCT, Blackboard, Moodle and may other open sources available has significantly contributed to this explosion.

Keegan (2002) suggested that many predicted e-learning to be the final solution for the education and the business world alike. He contended however that this was soon to change, as wireless telephones and computers were beginning replace wired ones. This has important implications for teaching and learning, as it would “free the learner” in terms of time and location due it’s mobility.

Brown (2005) concurred by saying that “mobile learning (m-learning) is a natural extension of e-learning and has the potential to make learning even more widely available and accessible than we are used to in existing e-learning environments.”

Edirisingha, Salmon & Fothergill (2007) reiterated that the widespread “penetration of broadband” communication technology, together with the increasing ownership of mobile media player devices can contribute to successful “content delivery and student engagement”. It optimizes the interactions between lectures and students, students and their peers and the digital environment had forever changed the millennial generation known as “digital natives” – as Prensky (2001) calls them.

Brown (2005) added, “The relevance of m-learning for Africa lies in the fact that the majority of learners in Africa are without infrastructure for access.” Students at Durban University of Technology (DUT) have access to PCs, albeit on a small scale. The ratio of computers to students is in the region of 1: 20. The PC laboratory for the Department of Radiography has provided access to computers via a teaching and development grant and is fortunate to have increased this ratio to 1:6.

DUT has a highly diverse population of students and the spectrum extends from the more affluent to those of low socio-economic status. So, there is a majority of the students who come from disadvantaged backgrounds and have no PC or Internet access outside campus. Wireless and mobile technologies make it possible to provide learning opportunities for these students who are without infrastructure or access. It also provides learning opportunities to students who are continually on the move (Gulc, 2008)

Podcasts are multimedia materials that play audio (MP3) and video (MP4) digital formats and are distributed via web-based technologies. As a result of the Internet, they provide mass access and contribute significantly to mobile learning. According to Salmon et al (n.d) podcasting started out for entertainment and information purposes only and the Informal Mobile Podcasting and Learning Adaptation (IMPALA) which commenced in June 2006, was the first funded research project to “address podcasting for pedagogical purposes.” Since then, there have been other studies that evaluated the impact of podcasting in education.

Podcasts can be hosted via the universities LMS or from an open site. And students can be informed via announcements from the LMS, email, SMS or via an Internet feed, as they become available.

CONTEXT

The millennial generation, also referred to as Generation Y, iGeneration, and Generation Me (Twenge, 2006) are those that have grown up with digital technology being an integral part of their lives. This is a generation in which the importance of the individual supersedes all other concerns. And the mobile revolution has fed directly into their insatiable desires to have everything at their fingertips and instant gratification. For example, instant messaging and text messaging has replaced the use of email in this generation and plays an integral part in their lives.

According to Prensky (2001), they spend their entire lives surrounded by and using all the tools and toys of the digital age - computers, videogames, MP3 players, iPods, video cams, cell phones. He argued that “today’s average college grads have spent less than 5,000 hours of their lives reading, but over 10,000 hours playing video games and 20,000 hours watching TV.” These ‘digital natives’ are entering our classrooms, and have surfed the Web since primary school, and it has increasingly taken over every facet of their personal and academic lives. They feel at ease with the technology and are confident users of Web 2.0 applications, like blogging, media sharing, social networking, podcasting, gaming, etc.

On the flipside of the coin, students who come from very disadvantaged backgrounds and have access problems are also entering our classrooms. They do not have computers or Internet access and have not fully exploited or enjoyed the benefits of e-learning and the technology. On the contrary, they experience a sense of fear of the “technology” and want to run away from it. But they have embraced the mobile technologies with a greater sense of security. Brown (2005) confirms this observation when he highlighted that “the adoption rate of mobile technologies in Africa’s developing countries, is among the highest rates globally. Forecasts estimate almost 100 million mobile users in Africa by 2005.”

Mobile learning or podcasting, in particular, seems set to address the diversity among the students at DUT. So the questions are:

- How does an educator respond to the challenge?
- Are the technologies, computers, the Internet, Web2.0 applications and mobile phones seen as threats or opportunities?
- Educators should be ready to embrace them and be receptive to exploring how learning technologies might pedagogically support them in what they do.

VISION

Typically the Internet and many of its applications operates on a “pull” technology.

When browsing/surfing or performing a refined search on the internet, one “pulls” the information by requesting specific pages, where a “page” is a file formatted for display on a Web browser. One is then able to navigate easily from one Web page to another by clicking on the hyperlinks (Umbach, 1997). He added that a new approach, the “push” technology was embarking.

According to the Wikipedia (2010) “push” technology operates differently and is defined as “ ... a style of Internet-based communication where the request for a given transaction is initiated by the publisher or central server. It is contrasted with pull technology, where the request for the transmission of information is initiated by the receiver or client.”

Additionally, Salmon et al (n.d) concurred that a subscription to the provider is necessary to receive web content. And that applications like iTunes or a LMS work very well, once a subscription has started. This allows podcasts to automatically download each time new material is available. Alternately “feeds” known by the term Really Simple Syndication (RSS), for podcasts are readily available from most websites that offer current and changing content. These feeds allows one to see when something new has been added to the website (Salmon et al n.d).

Williams (2007) added that a growing number of podcasts are available. He added that many people are using podcasts as audio or video blogs to “chronicle their lives or offer opportunities to express opinions.” YouTube, owned by Google Inc. is one of the most popular online video communities that allow millions of people to discover, watch and share originally created videos.

While there are many podcasts available on the learning topics for the subject Radiographic Pathology II, not all are appropriate for classroom use. So educators are responsible for ensuring that content is appropriate, relevant, enhances one’s lesson plan and is from a credible source. This, of course applies for all Internet resources. Choosing the right podcast for the classroom is critical.

In the absence of suitable multimedia resources available on the Web, one can create one's own resources. This very time consuming and requires proper audio and video recording software and hardware. However, educators can learn the skills required quickly. The question is – would podcasting for this subject enhance the student's learning?

The outcomes for this learning area of the subject requires the student to be familiar with normal appearances of body systems using various imaging modalities and to be able to recognize radiological appearances of common disease processes on these images. They must not only have the knowledge but also demonstrate a skill, which is not easily acquired. It is assumed that podcasting would be an ideal multimedia tool to assist the student in achieving these outcomes. Repetition of a learning event is the crucial element in the learning process.

It is with this in mind that the following pilot was undertaken. – as a means exploiting the technologies available to close the gaps in educating our students and addressing the diversity that exists among them, while at the same time meeting them all on the same playing field.

METHODOLOGY

Action research, according to Ferrence (2000), "is a process in which participants examine their own educational practice systematically and carefully, using the techniques of research." She adds that this is based on the following assumptions:

- Educators work best on problems identified by themselves.
- They become more effective when they examine and assess their own work and then consider ways of performing differently.
- They are more effectively by working collaboratively
- Peers assist other in their professional development (Ferrence, 2000)

Basically, it is an approach to examine one's work and seek opportunities for improvement.

O'Brien (1998) contends that action research be used in real situations as its primary intent is to solve real problems, rather than in experimental studies. According to Smith (2007) the action research process works through three basic phases: Look, Think (reflect) and Act. He adds that to 'look', "we define and describe the problem to be investigated and the context in which it is set." We need to build a picture by gathering information and describing what is happening. To 'think' he suggests "we analyse and interpret the situation." We interpret and reflect using the SWOT analysis. We look at the strength, weakness, opportunities and threats. And finally to act, "we judge the worth, effectiveness, appropriateness, and outcomes of those activities." We act to formulate solutions to resolving any issues and problems.

This survey was developed, using the action research model, to evaluate the impact of mobile learning, in the form of podcasts, on the student learning and their preparedness for this type of learning, albeit on a small scale. The pilot study took place in the Department of Radiography, Durban University of Technology, in the undergraduate level 2 subjects called Radiographic Pathology II.

A series of enhanced podcasts on Chest Pattern Recognition were introduced to complement the face – to – face interactions. Each one varied in time length and covered the important principles discussed in class. These podcasts were uploaded into the online classroom using the Blackboard LMS. And the students were asked to download these files using a digital format of choice (see Appendix 1).

A survey was created with an online survey tool called SurveyGizmo 3.0 (see Appendix 11). The link to the survey was posted in the online classroom. The survey was anonymous and no direct incentive for participation was offered. Participation was voluntary and 10 students completed the survey. Open-ended questions were also included to ascertain the perceived benefits and review their recommendations. Quantitative data was collected and the data reports were automatically generated and analysed by online survey tool.

RESULTS AND DISCUSSION

The survey results will be covered in four areas – access & listening habits, students' preparedness to share their entertainment spaces for learning, how the podcasts support student learning and finally their recommendations for future use of podcasts. Please refer to Appendix III for the results of the survey.

Access to enhanced podcasts & students' listening habits:

The majority of students (90%) indicated that they own a mobile device, with the major device being a cellphone with a MP3 player (Q 2 & Q3). However 80% preferred using the campus PCs for access, 50% used their own PCs and 30% needed an MP3 player with computer access (Q8). This finding has important implications – currently students are using the podcasts in a similar manner to streaming media and are not making their learning mobile. These podcasts have been made available to them in Blackboard, owing to possible issues of cost for downloading and convenience. This is confirmed in questions 9 and 10, when they all agreed that the podcasts were easily accessible and downloaded within a reasonable time. They might have felt differently, if they used their mobile devices. This finding possible addresses the impact of course materials via e-learning rather than mobile learning. However, further investigation is necessary to evaluate the impact of mobility, by the use of subscription model and the push technology.

Eighty percent of the students (Q12) indicated that they used Windows media player in preference to the digital players, which correlates to their preference to using PCs. Other media players of choice include Realplayer, Quicktime and iTunes. This will change when mobile devices are primarily used for subscriptions and download.

It was interesting to note that 80% of the students had listened to podcasts before with 56% of podcasts watched being educational. (Q4 & Q5) This shows that students have been exposed to this method of learning and, in fact, is promoted in the class interactions with them. However only 20% of students to more than 75% of the podcasts, and 50% of them listened to between 26 to 50% of the recordings. (Q6). The possible reason for this is that the method of assessment associated with this learning

content changed, so the student was not obliged or “*pressured*” to listen to the podcasts. One student (Q28) confirmed this by saying “*if we were doing a practical exam on viewing images I would think this would help a student immensely.*”

In the future, the assessment method will revert to the “exam” style and a more accurate evaluation on impact may be revealed.

Forty percent of the students listened to the entire podcasts once (Q7), with 20% listening more than once; while others indicated (20%) that they listened only to certain portions. This indicates that students interact with the podcasts in various ways and there is no single listening pattern.

Student preparedness to share their entertainment spaces with academic material:

Although a vast majority of students had indicated earlier that they have listened to podcasts, all of them indicated that they do not subscribe to any podcasts (Q13). Perhaps they will need some direction into the appropriate sites for relevant material. However, most of them (70%) indicated that they have used their mobile devices to listen to academic material (Q15).

All the students agreed that there is a difference between listening to music and listening to academic material. Most of their comments suggest that music is easier to listen to, more entertaining and more relaxing. One student’s comment – “*It is amazing how one learns the words to a song so much quicker as opposed to academic.*” Some also felt that listening to academic material required alertness and they did not find it very interesting or lost interest after a while. This confirms the general argument around the length of podcasts. The attention span of our students seems to decrease with time and Generation Me want instant gratification, so, podcasts should be as short as possible with many breaks (music, jokes, current, etc.) in between if the length cannot be compromised. The majority (80%) of the students agreed that the length for these podcasts were appropriate for its content (Q26), although one student (Q30) probably felt that they were too long.

When asked about how they felt about sharing their entertainment space with academic material (Q13), their answers were mostly positive. As can be seen from their responses, most of the students seem happy to share the space on their mobile devices for academic material. Some reasons included easy access, ability to repeat and learn at own pace, and *"its great to have many resources to study"*.

One student seemed very hesitant to use their MP3 player but is happy to store them on a laptop. Two students seem to have misunderstood the question.

Podcasting impact on student learning:

When asked about how easy it was to adapt to this new way of learning (Q19), 40% reported they were very comfortable with it, a further 40% indicated that they needed to develop it as a habit. Twenty percent felt that they needed to get used to listening to it in the early days. One student also indicated that they needed to allocate extra time for this activity.

All of them agreed that the content of all the podcasts were well organized and easy to follow, and that the use of slides/visuals enhanced the podcasts (Q22, Q24 & Q 27). As indicated earlier, enhanced podcasts are audio files with additional features to aid the listener. In this study slides were used. Other features include splitting the podcast into chapters with pointers for navigation. This allows the students to replay certain sections with relative ease. These approaches cater for a wider variety of learning styles.

Most of them agreed that the podcasts were appropriate for the area of study (Q20), were interesting enough to keep their interest (Q23), and most importantly the podcasts enhanced their learning (Q21). This was obviously in keeping with the desired outcome.

Strengths and weaknesses:

Open-ended questions were included to determine the strengths and weaknesses of using podcasts to support learning and any recommendations for students and the lecturer in its future use.

Most of the students thought it is the best method of learning for the targeted learning outcomes for the subject (see responses below).

Would you consider the podcast the best method of learning for this learning outcomes?
JUSTIFY your answer.

Count	Response
1	it may be very helpful, i in particular like to listen to information instead of just reading it
1	Yes most definitely. I learn better with pictures to enhance the learning process. This is a new acceptable method, which I feel would be the appropriate way of learning.
1	No because I am not used to this method of learning as i have been learning from books for many years. However, it will help with visual understanding. My eyes also get sore while looking at the screen and i get a headache.
1	it is an interesting method, will have to try it out first to see if it will be a better method of learning. i think it could work because you get to learn at your own pace and you are able to go back to something if you have forgotten.
1	i dont think its the best.it can be used as an extra learning method to enhance my understanding of pathology
1	no... i feel that i need more than the podcasts... its not the best method for me...i prefer lectures as well but it is also very good.
1	yes, not only was the theory behind the work well explained but the multimedia (x-rays) enhanced the explanation which i find is the key in learning this type of content.
1	not really as one tends to get bored after a while of just listening and not being stimulated interlectually.
1	if we were doing a practical exam on viewing images i would think this would help a student immensely.
1	Yes because as I said before you can learn at your own pace and always go back. This is important in that when there is confusion you can go view stuff again. Especially with pattern recognition the class slides sometimes are not adequate enough so in this way we can go over stuff at our own leisure and really grasp the important things.

The strengths identified (Q28 & Q29):

- Caters for different learning styles and the millennial generation.
- One is able to learn at one's own pace and repeat the learning.
- Theory behind work was well explained.
- Immense help in preparation for exams.
- Promotes interactive/social/collaborative learning.
- Enables learning 'on the go'.

Some weaknesses identified:

- Eyes get sore while looking at the screen.
- Inclination to get bored after a while.

For suggestions for future students and lecturers or designers of podcasts, see responses below. Each student's response speaks for itself.

What suggestions can you make in order to help other students to learn from podcasts?

Count	Response
1	
1	Try it! You will never know until you do.....
1	have a pen and page next to you so that you can jot down notes to help you stay interested
1	i suggest that you page through the prescribed textbook before you listen to the podcast.
1	make time for academic material and new ways of studying because it helps
1	they should try it out properly...you wont know if they are any good unless u try it urself
1	always have them on hand and keep listening to them regularly so that you will not forget, not only for test purposes but to use during clinical rotations and everyday work thereafter.
1	students often think academic learning is very boring..but for lazy readers like myself the podcasts are of excellent use....i first also thought this would be boring but to my surprise it wasn't bad at all. students need to just give it a try
1	This is good interactive learning in that we could use it to learn in our breaks, on the long drive home, etc so the time issue may never be a problem again. We can get together as a group as well to view it and then discuss later. So if some people are confused during a lecture and scared to ask, they can view for themselves and learn for themselves.
1	Support the podcast with handouts of the same content because my eyes get sore while looking at the screen

Imagine you are the lecturer. Can you think of other ways of using podcasts or what you would do differently?

Count	Response
1	
1	Give out written notes with the same content so the student can read along with it
1	i would alloocate a specific time for podcast that can correlate with the theory lectures
1	make the podcasts shorter and more concise to hold the listeners attention.
1	Okay firstly I would like use a little more arrows to visual what I am talking about. I would mention something then it would get highlighted so that the student would know exactly which part of the picture that I am looking at. Try also to use some humor in the podcast.
1	i would make every1 listen to them and do this survey...not just make it voluntary. i would lecture infront, plus use the podcast and give notes ... but i think itz cool
1	id make a revision podcast just before a test so that students can listen to it while studying, this would not only help them in understanding the content of the subject but also encourage them to study
1	i think its a great new learning method that students can easily adapt to, since they always listening to music and have some type of new gadget on them. it will be nice to extend this learning method into classroom theory lectures, where you would listen to the podcast then have to answer questions as revision. its actually a very useful and could work out to be a great learning experience!!!!
1	i would include other types of media to make it a more fun experince for eg randomly podcast jokes, new music and campus news. this would wanna make students check the podcasts more often therefore they would be seeing academic material aswell. you know students get bord easily.
1	I would ensure that a computer is a prerequisite for this course (I had to buy one this year, and it has added so much benefit to my learning, especially in the case of assignments and the slides which is bette to manipulate on the computer). The computer lab needs to be opened outside the lecture times, because sometimes lab facilities are not available. Therefore, one would have more time to watch these Podcasts.

Key findings:

The pilot study highlighted that podcasting does contribute to student learning and:

- caters for the specific needs of diverse students and their cognitive abilities,
- has the potential to motivate the student to engage deeply with learning material,
- promotes independent learning as well as a personalized learning experience,
- enables learning anytime and anywhere and creates opportunities for learning that is not possible in the traditional classroom or through e-learning,
- has potential to develop positive attitude to a subject that is considered very boring and that students generally find very challenging,
- provides tools for and encourages life long learning.

The study also highlighted that listening for entertainment is very different to listening for learning and that the podcasts must be integrated with other learning activities so that students can recognize its value and relevance to the subject, both in the academic and clinical environments.

WAY FORWARD

Student responses to podcasting are mostly positive.

Certain assumptions were made at the start of this project.

Students would be unwilling to share their entertainment spaces with academic material due to memory limitations or associated costs. The results were contrary and in fact they are very happy to use their listening devices for learning.

Another assumption was student attendance would drop, if academic resources were available. However, the primary benefit of podcasting is its ability to replay the learning event. This extends to all students who access them and not only those who miss a class. And in the context of this pilot study, the podcasts made available were designed to complement the face-to-face interactions and not substitute them. Furthermore poor attendance is already an issue outside of the influences of elearning or mobile learning. So, this assumption was not tested in this pilot. This will be considered in the next action research cycle.

Lessons learnt

“Videos” were created for this learning component of this subject in 2008 and 2009.. These were made available to students on CDs, as there were no PC lab facilities at that time. When listening to them, many errors were identified, as they were impromptu. They were also only created for Windows Media Player.

Scripting has a significant impact on the quality of podcasts created. The podcasts used in this pilot study were created using scripting. The same resources have been made available to students in the correct format on CDs but can still be used on their mobile devices.

Audio and video convertors can be used to convert the files into many usable formats for different devices. MP3 and MP4 formats seem to be the most versatile and can work using multiple platforms, with iTunes, Realplayer, Quicktime being the more popular ones. There are also a variety of free media players available on the Web.

Lastly, the single large podcasts will be recreated into a 12 part series of podcasts for easy dissemination and distribution. The original time lengths were very long, with some extending over an hour. They were also very huge files for streaming and downloading, with some extending over 30 Mb. Care has been taken to keep file size down to a minimum and the length within acceptable limits.

Future adjustments

On reflection, the podcasts tended to be too serious and can include relevant humour. campus news, etc. The concern with including current information is that it limits its reusability.

The podcasts for this subject requires using of visuals and cannot rely on audio only. Additionally, they vary in length in order to adequately cover the content, with this leading to some podcasts with lengthy listening times. Splitting the content into “chapters” with cues in the audio track will allow students to navigate through them with ease and replay only certain sections as required.

According to Hutchison, Tin & Cao (n.d) “the subscription model streamlines the process for students to locate and retrieve newly available learning materials” – a new and better way for delivery. Although this concept is intriguing and motivated the use of the technology, it’s impact was not tested in this pilot and the next phase will attempt to publish podcasts to an RSS feed and encourage students to subscribe and test the push versus pull technology.

Suggestions from the students indicate an extension of podcasting into other areas of the subject – and perhaps use a more problem-based approach should be used, so students can appreciate the value and relevance of this subject in their actual practice. Podcasting will continue to be an integral part of the resources available to students

for this subject. The results show a positive response. The radiography students spend a considerable amount of time in clinical environments for WIL. They would be able to subscribe or download podcasts while on campus and review them when they are in the clinical environment. This will promote continuity in the learning process and instill lifelong learning skills.

According to Salmon et al (n.d), students are already familiar and have the necessary skills needed to create podcasts. Student generated podcasts – include dialogues/discussions among students; student presentations enhanced podcasts and digital storytelling. This will encourage student collaboration, and active learning and keep them motivated. The learning moves from teacher-centered to student centered. Generation Me tend to enjoy the limelight and podcasts may provide students with a sense of audience.

Recordings of the actual lectures will benefit all students, as they will be able to repeat anytime, anywhere, most beneficial to 2nd language speaking students, be able to review lectures before assessments and in some instances “catch-up” with missed lectures (whether legitimate or not). There seems to be a higher absenteeism in later years. The additional benefit is the lecturer gets to listen to his or her own voice and improve future presentations.

Students do not prepare adequately for lectures and do not like reading anymore. According to Nie (2006), podcasting can provide listening materials for students to think about before the lecture. Podcasting can also be used to provide feedback for assessments and FAQs. The usefulness for these applications will have to be examined.

Final words

To reiterate the words of Brown (2005), educators need to embrace the rich learning enhancing possibilities that mobile learning provides and fulfils the growing demands for life-long learning opportunities that enable you to learn “on the go”. Its success depends on the ability to design pedagogical sound environments that enhance learning and not just the technological developments and the possibilities they provide.

REFERENCES

- ANONYMOUS 2010. Push Technology. *Wikipedia*. Available: http://en.wikipedia.org/wiki/Push_technology (Accessed 27 October 2010)
- BROWN, T. 2005. Towards a model for m-Learning in Africa. *International Journal on E-Learning* [Online], 4. Available: <http://www.up.ac.za/telematic/article.pdf>.
- EDIRISINGHA, P., SALMON, G. & FOTHERGILL, J. 2007. Profcasting - a pilot study and guidelines for integrating podcasts in a blended learning environment. *EDEN Conference 2007*. IMPALA.
- FERRANCE, E. 2000. Action Research. *Themes in Education* [Online]. Available: http://www.alliance.brown.edu/pubs/themes_ed/act_research.pdf [Accessed 26 October 2010].
- GULC, E. 2008. Learning 2.0 Harnessing Technology to enhance education. *Escalate News*, 2-4.
- HUTCHISON, M., T, T. & CAO, Y. "In-Your_Pocket"and "On-The-Fly:"Meeting the Needs of Today's Generation of Online Learners with Mobile Learning Technology. Athabasca University.
- KEEGAN, D. 2002. The Future of Learning: From eLearning to mLearning. *ZIFF Papiere*, 119.
- NIE, M. 2006. *The Potential Use of Mobile/Handheld Devices, Audio/Podcasting Material in Higher Education - A draft review* [Online]. IMPALA. Available: <http://www2.le.ac.uk/projects/impala/presentations/Berlin/The%20Potential%20Use%20of%20Mobile%20Devices%20in%20Higher%20Education> [Accessed 06 August 2010].
- O'BRIEN, R. 1998. *An Overview of the Methodological Approach of Action Research* [Online]. Faculty of Information Studies, University of Toronto. Available:

<http://www.mabvietnam.net/NetDocuments/Action%20researchMet.pdf>.

PRENSKY, M. 2001. Digital Natives, Digital Immigrants. *On the Horizon*, 9, 1-6.

SALMON, G., MOBBS, R., EDIRISINGHA, P. & DENNETT, C. no date. Podcasting Technology. In: SALMON, G. & EDIRISINGHA, P. (eds.) *Podcasting for Learning in Universities*. Open University Press. McGraw -Hill.

SMITH, M. 2007. "Action Research". *The encyclopedia of informal education* [Online]. Available: <http://www.infed.org/research/b-actres.htm> [Accessed 26 October 2010].

TWENGE, J. 2006. *Generation Me* [Online]. Free Press. Available: <http://eubie.com/genme.pdf>.

UMBACH, K. 1997. What is "Push Technology"? In: California Research Bureau, ed.: CRB Note.

WILLIAMS, B. 2007. Exerpts from Educator's Podacst Guide. *International Society for Technology in Education*, 44-49.